

WHAT IS CLAIMED IS:

1. A power system that comprises fuel cells and a fuel gas generation system for generating a hydrogen-rich fuel gas to be supplied to the fuel
5 cells, and outputs electric power,
the fuel gas generation system comprising:
a chemical reaction module that generates a hydrogen-containing gaseous mixture from a predetermined material through a chemical process;
and
10 a hydrogen separation module that separates hydrogen from the gaseous mixture,
the power system further comprising:
a hydrogen supply line that supplies the separated hydrogen to the fuel cells;
15 a stop signal input module that receives a stop signal for stopping the supply of hydrogen to the fuel cells;
a purge gas supply module that supplies specified purge gas for removal of hydrogen from the hydrogen separation module; and
a stop control module that selects a hydrogen purge mode that
20 activates and controls the purge gas supply module to remove hydrogen from the hydrogen separation module or a hydrogen no-purge mode that stops the purge gas supply module as a stop control mode, executes stop control in the stop control mode to stop the supply of hydrogen to the fuel cells.
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2. The power system in accordance with claim 1, the power system

further comprising:

a parameter input module that inputs a predetermined parameter representing a working state of at least one of the power system and a system with the power system mounted thereon,

5 wherein the stop control module selects either of the hydrogen purge mode and the hydrogen no-purge mode as the stop control mode, based on the input parameter, and executes the stop control in the selected stop control mode.

10 3. The power system in accordance with claim 1, wherein the stop control module changes over the stop control mode to the hydrogen purge mode, after execution of the stop control in the hydrogen no-purge mode.

15 4. The power system in accordance with claim 3, the power system further comprising:

a parameter input module that inputs a predetermined parameter representing a working state of at least one of the power system and a system with the power system mounted thereon,

20 wherein the stop control module switches over the stop control mode from the hydrogen no-purge mode to the hydrogen purge mode, when the input parameter fulfils a preset condition.

5. The power system in accordance with claim 4, the power system further comprising:

25 a temperature measurement module that measures temperature at a preset position in the power system,

wherein the predetermined parameter includes a parameter representing the observed temperature, and

the stop control module switches over the stop control mode from the hydrogen no-purge mode to the hydrogen purge mode, when the observed
5 temperature is not higher than a preset level.

6. The power system in accordance with claim 2, the power system further comprising:

a temperature measurement module that measures temperature at
10 a preset position in the power system,

wherein the predetermined parameter includes a parameter representing the observed temperature, and

the stop control module switches over the stop control mode from the hydrogen no-purge mode to the hydrogen purge mode, when the observed
15 temperature is not higher than a preset level.

7. The power system in accordance with claim 1, the power system further comprising:

a booster mechanism that boosts up a pressure of hydrogen in the
20 hydrogen supply line,

wherein the stop control module controls the booster mechanism to boost up the pressure of hydrogen in the hydrogen supply line, in the setting of the hydrogen no-purge mode to the stop control mode.

25 8. The power system in accordance with claim 1, the power system further comprising:

a temperature retention module that keeps temperature in the hydrogen separation module,

wherein the stop control module controls the temperature retention module to keep the temperature in the hydrogen separation module, in the
5 setting of the hydrogen no-purge mode to the stop control mode.

9. The power system in accordance with claim 8, wherein the stop control module stops the operation of the temperature retention module, when the stop control in the hydrogen no-purge mode continues for at least
10 a preset time period.

10. The power system in accordance with claim 1, wherein the stop control module actuates the purge gas supply module on the condition that hydrogen remains in the hydrogen separation module, in the setting of the
15 hydrogen no-purge mode to the stop control mode.

11. The power system in accordance with claim 10, wherein the stop control module stops the operation of the purge gas supply module after elapse of a predetermined time period since a start of actuation of the purge
20 gas supply module, in the setting of the hydrogen no-purge mode to the stop control mode.

12. The power system in accordance with claim 1, the power system further comprising:
25 a restart request input module that receives a restart request to restart the fuel gas generation system, where the restart request includes

an output demand to the fuel cells; and

a material supply control module that regulates a supply of the material to the chemical reaction module, in response to the output demand,

the material supply control module supplying a greater amount of the material to the chemical reaction module than a normal supply in a state of normal operations, in response to input of the restart request into the restart request input module, after a start of the stop control in the hydrogen purge mode.

10 13. The power system in accordance with claim 12, wherein the material supply control module supplies the greater amount of the material to the chemical reaction module than the normal supply in the state of normal operations, only when the output demand is not greater than a preset level after a start of the stop control in the hydrogen purge mode.

15 14. The power system in accordance with claim 1, the power system further comprising:

a secondary battery; and

a power supply control module that controls supply of electric power from the secondary battery according to a state of the stop control of the fuel cells.

15 15. The power system in accordance with claim 14, the power system further comprising:

25 an output demand input module that receives an output demand to the power system,

wherein in response to the output demand of not greater than a preset level, the power control module controls the secondary battery to output electric power and the stop control module executes the stop control in the hydrogen no-purge mode.

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16. The power system in accordance with claim 14, the power system comprising:

a state-of-charge measurement module that measures a state of charge of the secondary battery,

10 wherein the stop control module executes the stop control in the hydrogen purge mode, when the observed state of charge is not higher than a preset level.

15 17. A mobile object having a motor as a driving source, the mobile object comprising the power system in accordance with claim 2 as a power source of the motor.

20 18. The mobile object in accordance with claim 17, wherein the predetermined parameter includes a parameter representing an on-off state of a starter switch of the motor, and

the stop control module executes the stop control in the hydrogen purge mode when the starter switch is off.

25 19. A mobile object having a motor as a driving source, the mobile object comprising the power system in accordance with claim 1 as a power source of the motor.

20. The mobile object in accordance with claim 19, the mobile object further comprising:

an operation state input module that inputs an operation state of a manipulation unit for moving the mobile object; and

a restart control module that restarts the fuel gas generation system when the input operation state allows for movement of the mobile object, in the setting of the hydrogen purge mode to the stop control mode.

21. The mobile object in accordance with claim 19, the mobile object further comprising:

a moving speed measurement module that measures a moving speed of the mobile object; and

a restart control module that restarts the fuel gas generation system when the observed moving speed exceeds a preset level, in the setting of the hydrogen purge mode to the stop control mode.

22. The mobile object in accordance with claim 21, the power system further comprising:

a restart request input module that receives a restart request to restart the fuel gas generation system, where the restart request includes an output demand to the fuel cells,

the mobile object further comprising:

a temperature measurement module that measures temperature at a preset position in the fuel gas generation system,

wherein the stop control module warms up the fuel gas generation

system in response to input of the restart request into the restart request input module, when the observed temperature is not higher than a preset lower limit, in the setting of the hydrogen purge mode to the stop control mode.

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23. The mobile object in accordance with claim 20, the power system further comprising:

a restart request input module that receives a restart request to restart the fuel gas generation system, where the restart request includes
10 an output demand to the fuel cells,

the mobile object further comprising:

a temperature measurement module that measures temperature at a preset position in the fuel gas generation system,

wherein the stop control module warms up the fuel gas generation
15 system in response to input of the restart request into the restart request input module, when the observed temperature is not higher than a preset lower limit, in the setting of the hydrogen purge mode to the stop control mode.

20 24. A mobile object having a motor as a driving source, the mobile object comprising the power system in accordance claim 3 as a power source of the motor.

25 25. A mobile object having a motor as a driving source, the mobile object comprising the power system in accordance claim 7 as a power source of the motor.

26. A mobile object having a motor as a driving source, the mobile object comprising the power system in accordance claim 8 as a power source of the motor.

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27. A mobile object having a motor as a driving source, the mobile object comprising the power system in accordance claim 10 as a power source of the motor.

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28. A mobile object having a motor as a driving source, the mobile object comprising the power system in accordance claim 12 as a power source of the motor.

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29. A mobile object having a motor as a driving source, the mobile object comprising the power system in accordance claim 14 as a power source of the motor.